DEVICE FOR SUPPORTING OPTICAL SCANNER

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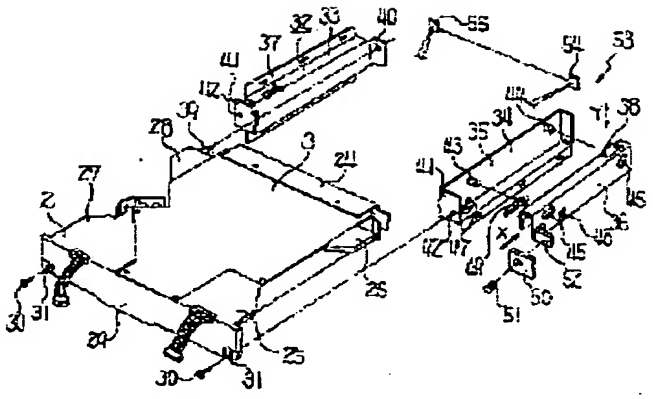
Abstract of **JP8171063**

PURPOSE: To accurately and easily perform the assembly adjusting work of an optical housing of an image forming device. CONSTITUTION: When the optical housing 2 provided with a laser light source, a deflecting means and an image-formation optical system is attached along a guiding means 32, the housing 2 is positioned in a scanning direction by a scanning direction positioning means 40 and positioned in an optical axis direction just by abutting on an optical axis direction positioning means 41. By providing a subscanning direction inclination adjusting means 53, the inclination of the housing 2 in the subscanning direction of a scanning line is adjusted.



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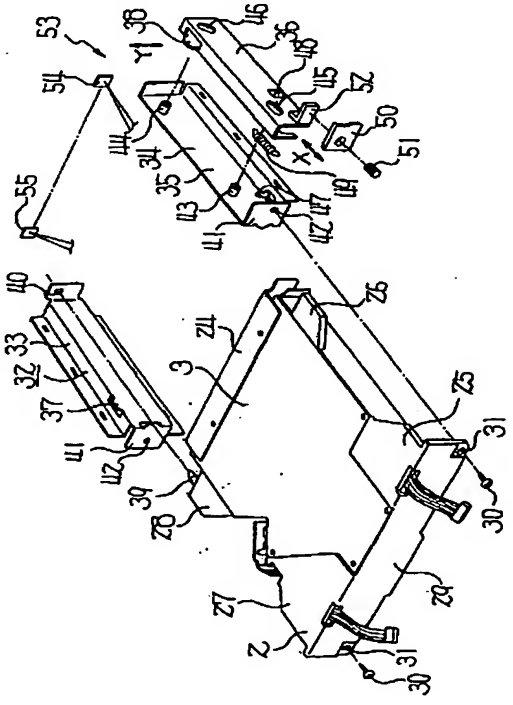
(54)【発明の名称】　光走査装置の支持装置

(57)【要約】

【目的】　画像形成装置に対する光学ハウジングの組立調整作業を正確且つ容易に行わせ得るようにすること。

【構成】　レーザ光源、偏向手段、結像光学系等が設けられた光学ハウジング２を案内手段３２に沿わせて装着したときに、走査方向位置決め手段４０により光学ハウジング２の走査方向の位置を定めるとともに、光学ハウジング２を光軸方向位置決め手段４１に当接させるだけで光軸方向の位置を定めるようにした。また、副走査方向傾き調整手段５３を設けることにより、走査線の副走査方向における光学ハウジング２の傾きを調整し得るようにする。



【特許請求の範囲】

【請求項１】　レーザ光源と、このレーザ光源から出射されたレーザ光を偏向する偏向手段と、この偏向手段により偏向されたレーザ光を被走査面に結像する結像光学系とが装着された光学ハウジングを設け、前記光学ハウジングの走査方向での位置決めを行う走査方向位置決め手段と、前記光学ハウジングを光軸方向に摺動自在に支える案内手段と、前記光学ハウジングの光軸方向への挿入時にこの光学ハウジングの一部に当接してこの光学ハウジングの光軸方向の位置決めを行う光軸方向位置決め手段とを設けたことを特徴とする光走査装置の支持装置。

【請求項２】　光学ハウジングの両側を摺動自在に保持する左右一対のスライドレールにより案内手段を形成し、前記スライドレールの一方を光軸方向と直交する方向に変位自在に設けることにより走査線の副走査方向における前記光学ハウジングの傾きを調整する副走査方向傾き調整手段を構成したことを特徴とする請求項１記載の光走査装置の支持装置。

【請求項３】　左右一対のスライドレールの一方の奥側の近傍に光学ハウジングの一側を光軸方向に着脱自在及び光軸方向と直交する方向に回動自在に保持して前記光学ハウジングの走査方向の位置を定める走査方向位置決め手段を設け、前記光学ハウジングの自由端側を支える他方のスライドレールを光軸方向と直交する方向に変位自在に設けることにより走査線の副走査方向における前記光学ハウジングの傾きを調整する副走査方向傾き調整手段を構成したことを特徴とする請求項２記載の光走査装置の支持装置。

【請求項４】　光学ハウジングの出射側の少なくとも自由端側に対向する位置にレーザ光を受光するセンサと、このセンサの出力により前記光学ハウジングの副走査方向の傾き度を演算する演算手段と、この演算手段による演算結果に基づいて副走査方向傾き調整手段を駆動する駆動手段とを設けたことを特徴とする請求項３記載の光走査装置の支持装置。

【請求項５】　被走査面の数に対応させて複数組み光学ハウジングを並設するとき、請求項３記載の走査方向位置決め手段と案内手段と光軸方向位置決め手段と副走査方向傾き調整手段とを、それぞれ同一の支持部材により支持したことを特徴とする光走査装置の支持装置。

【請求項６】　各光学ハウジングの１ライン毎の走査開始位置と走査終了位置とを光学的に検出するセンサと、これらのセンサの出力に基づいて前記各光学ハウジングの副走査方向の傾き度を演算する演算手段と、この演算手段による演算結果に基づいて前記各光学ハウジングに対応する副走査方向傾き調整手段を駆動する駆動手段とを設けたことを特徴とする請求項５記載の光走査装置の支持装置。

【請求項７】　レーザ光源と、このレーザ光源から出射

されたレーザ光を偏向する偏向手段と、この偏向手段により偏向されたレーザ光を被走査面に結像する結像光学系とが装着された光学ハウジングを複数個並設し、これらの光学ハウジング内の前記偏向手段はそれぞれの走査速度切替手段を具備することを特徴とする請求項１記載の光走査装置の支持装置。

【請求項８】　各光学ハウジングの１ライン毎の走査開始位置と走査終了位置とを光学的に検出するセンサを設け、これらのセンサが検出する走査開始時と走査終了時との時間差に基づいて走査速度切替手段を作動させるようにしたことを特徴とする請求項７記載の光走査装置の支持装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、レーザープリンタ、デジタル複写機等の画像形成装置において、被走査面に対してレーザ光を走査する偏向走査型の光走査装置の支持装置に関する。

【０００２】

【従来の技術】従来、レーザ光源とポリゴンミラーを有する偏向手段と結像光学系とが装着された光学ハウジングを設け、レーザ光源から出射されたレーザ光を偏向手段により偏向するとともに結像手段により感光体等の被走査面に結像するようにした光走査装置がある。

【０００３】このような光走査装置の光学ハウジングは、偏向手段の一構成部品となるポリゴンモータや結像光学系の取付基準面となる設置面を有し、この設置面をフレーム構造に載置して垂直方向から取り付ける構造が採用されている場合が多い。カラー画像形成装置のように複数の光走査装置を必要とする画像形成装置の場合には、光学ハウジングを前述した方法で積み上げている。画像品質を満足させるためには、各光走査装置と被走査面との相対関係を正確に調整する必要があるが、光学ハウジングやフレーム等の剛性の影響により、調整作業が困難であり、また、調整機構が大掛かりとなる。特に、カラー画像を形成するために、複数の画像形成ステーション毎に光走査装置を配設する画像形成装置の場合には、構造が極めて大掛かりとなる。

【０００４】

【発明が解決しようとする課題】そこで、特開平４－１３１８７２号公報や特開平４－１３１８７６号公報に記載されているように、転写画像を読み取り、画像書き出しのタイミングを変更し、或いは、折り返しミラーの角度をアクチュエータで変更する等の方法により、基準となる画像形成ステーションに対する画像のずれを補正する提案がなされているが、ミラーを変位させるために各光走査装置毎に複数のアクチュエータを必要とし、構造が複雑化する。

【０００５】

【課題を解決するための手段】請求項１記載の発明は、

レーザ光源と、このレーザ光源から出射されたレーザ光を偏向する偏向手段と、この偏向手段により偏向されたレーザ光を被走査面に結像する結像光学系とが装着された光学ハウジングを設け、前記光学ハウジングの走査方向での位置決めを行う走査方向位置決め手段と、前記光学ハウジングを光軸方向に摺動自在に支える案内手段と、前記光学ハウジングの光軸方向への挿入時にこの光学ハウジングの一部に当接してこの光学ハウジングの光軸方向の位置決めを行う光軸方向位置決め手段とを設けたことを光走査装置の支持装置である。

【０００６】請求項２記載の発明は、請求項１記載の発明において、光学ハウジングの両側を摺動自在に保持する左右一対のスライドレールにより案内手段を形成し、前記スライドレールの一方を光軸方向と直交する方向に変位自在に設けることにより走査線の副走査方向における前記光学ハウジングの傾きを調整する副走査方向傾き調整手段を構成した光走査装置の支持装置である。

【０００７】請求項３記載の発明は、請求項２記載の発明において、左右一対のスライドレールの一方の奥側の近傍に光学ハウジングの一側を光軸方向に着脱自在及び光軸方向と直交する方向に回動自在に保持して前記光学ハウジングの走査方向の位置を定める走査方向位置決め手段を設け、前記光学ハウジングの自由端側を支える他方のスライドレールを光軸方向と直交する方向に変位自在に設けることにより走査線の副走査方向における前記光学ハウジングの傾きを調整する副走査方向傾き調整手段を構成した光走査装置の支持装置である。

【０００８】請求項４記載の発明は、請求項３記載の発明において、光学ハウジングの出射側の少なくとも自由端側に対向する位置にレーザ光を受光するセンサと、このセンサの出力により前記光学ハウジングの副走査方向の傾き度を演算する演算手段と、この演算手段による演算結果に基づいて副走査方向傾き調整手段を駆動する駆動手段とを設けた光走査装置の支持装置である。

【０００９】請求項５記載の発明は、被走査面の数に対応させて複数組み光学ハウジングを並設するとき、請求項３記載の走査方向位置決め手段と案内手段と光軸方向位置決め手段と副走査方向傾き調整手段とを、それぞれ同一の支持部材により支持した光走査装置の支持装置である。

【００１０】請求項６記載の発明は、請求項５記載の発明において、各光学ハウジングの１ライン毎の走査開始位置と走査終了位置とを光学的に検出するセンサと、これらのセンサの出力に基づいて前記各光学ハウジングの副走査方向の傾き度を演算する演算手段と、この演算手段による演算結果に基づいて前記各光学ハウジングに対応する副走査方向傾き調整手段を駆動する駆動手段とを設けた光走査装置の支持装置である。

【００１１】請求項７記載の発明は、請求項１記載の発明において、レーザ光源と、このレーザ光源から出射されたレーザ光を偏向する偏向手段と、この偏向手段により偏向されたレーザ光を被走査面に結像する結像光学系とが装着された光学ハウジングを複数個並設し、これらの光学ハウジング内の前記偏向手段はそれぞれの走査速度切替手段を具備する光走査装置の支持装置である。

【００１２】請求項８記載の発明は、請求項７記載の発明において、各光学ハウジングの１ライン毎の走査開始位置と走査終了位置とを光学的に検出するセンサを設け、これらのセンサが検出する走査開始時と走査終了時との時間差に基づいて走査速度切替手段を作動させるようにした光走査装置の支持装置である。

【００１３】

【作用】請求項１記載の発明によれば、光学ハウジングを案内手段に沿わせて挿入するだけの容易な操作で走査方向の位置決めと光軸方向の位置決めとを行うことが可能となる。

【００１４】請求項２記載の発明によれば、一方のスライドレールの位置を変えることにより光学ハウジングの副走査方向の傾きが調整されるため、副走査方向傾き調整手段を少ない部品で構成することが可能となる。

【００１５】請求項３記載の発明によれば、スライドレールに沿って光学ハウジングを挿入したときに光学ハウジングの走査方向の位置が走査方向位置決め手段により定められ、光学ハウジングの自由端側を支えるスライドレールを変位させて光学ハウジングを回動させるだけでの操作で、光学ハウジングの副走査方向の傾きが調整される。

【００１６】請求項４記載の発明によれば、被走査面にレーザ光を結像した結果を再生しなくても、センサからの出力に基づいて光学ハウジングの傾き度が自動的に補正される。

【００１７】請求項５記載の発明によれば、複数の画像形成ステーションを有する画像形成装置を製作する場合に、それぞれの画像形成ステーションに配置される光学ハウジングの相対位置の精度が高められる。

【００１８】請求項６記載の発明によれば、各センサの受光開始位置及び受光終了位置の差を検出し、副走査傾き調整手段を駆動して各光学ハウジングの傾きを調整することにより、被走査面にレーザ光を結像した結果を再生しなくても、各光学ハウジングの相対的な傾き度が自動的に補正される。

【００１９】請求項６記載の発明によれば、各センサの出力に基づいて副走査傾き調整手段を駆動して各光学ハウジングの傾きを調整することにより、被走査面にレーザ光を結像した結果を再生しなくても、各光学ハウジングの相対的な傾き度が自動的に補正される。

【００２０】請求項７記載の発明によれば、個々の光学ハウジングの光軸方向の位置にバラツキが生じたとしても、偏向手段の走査速度を変えることにより、形成される画像の倍率が一定に補正される。

【００２１】請求項８記載の発明によれば、個々の光学ハウジングの光軸方向の位置にバラツキが生じたとしても、センサの出力に基づいて偏向手段の走査速度を変えることにより、形成される画像の倍率が自動的に一定に補正される。

【００２２】

【実施例】本発明の一実施例を図面に基づいて説明する。まず、図２を参照して光走査装置１の構成について述べる。２は偏平な光学ハウジングで、この光学ハウジング２の上面の開口面はカバー３により閉塞される。光学ハウジング２には、コリメータレンズ（図示せず）内蔵するレーザ光源４と、シリンドルカルレンズ５と、レーザ光源４から出射されてシリンドルカルレンズ５を通ったレーザ光を偏向する偏向手段６と、この偏向手段６により偏向されたレーザ光を後述する被走査面に結像する結像光学系７，８と、画像書き込み領域外におけるレーザ光を反射するミラー９と、このミラー９からの反射光を受光することによりレーザ光源４からの画像信号の出力タイミングを設定する同期検知センサ（受光素子）１０とが保持されている。前記偏向手段６は前記ハウジング２に固定されたポリゴンモータ１１と、このポリゴンモータ１１に直結されたポリゴンミラー１２と、このポリゴンミラー１２をその一部を残して覆う防音カバー１３とよりなる。

【００２３】前記シリンドルカルレンズ５は板ばね１４により前記光学ハウジング２の底面に形成された位置決め部（図示せず）に押圧されて固定されている。また、光学ハウジング２には複数の位置決め部１５，１６，１７とボス１８とが形成されている。そして、前記結像光学系７（ｆθレンズ）を位置決め部１５に押圧する板ばね１９を有する支持部材２０がボス１８に取り付けられ、結像光学系８（トロイダルレンズ）が板ばね２１により位置決め部１６に押圧されて位置決めされ、ミラー９が板ばね２２により位置決め部１７に押圧されて位置決めされている。さらに、前記カバー３には防塵プレート２３を着脱自在に保持する保持部材２４が取り付けられている。さらに、前記光学ハウジング２には、両側から拡開する拡開片２５，２６，２７，２８と背面板２９とが形成され、この背面板２９の両側には取付ねじ３０が挿入される取付孔３１が形成されている。

【００２４】次いで、図１に示すように、前記光学ハウジング２を光軸方向に摺動自在に案内する案内手段３２が設けられている。この案内手段３２は左右一対のスライドレール３３，３４により形成されている。一方のスライドレール３４は固定レール３５と可動レール３６とを有し、スライドレール３３の上面には前記拡開片２７を載置する突起３７が形成され、可動レール３６の上面には前記拡開片２６を支える突起３８が形成されている。

【００２５】そして、前記スライドレール３３の一端には、前記光学ハウジング２の片側の端部に立設された位置決めピン３９を嵌合させることによりこの光学ハウジング２の走査方向の位置を定める走査方向位置決め手段である走査方向位置決め孔４０が形成されている。さらに、スライドレール３３と固定レール３５との端部には、光学ハウジング２の前記背面板２９の両側部を当接させることにより、この光学ハウジング２の光軸方向の位置を定める光軸方向位置決め手段である光軸方向位置決め片４１が形成され、これらの光軸方向位置決め片４１には前記取付ねじ３０が螺合されるねじ孔４２が形成されている。

【００２６】さらに、前記固定レール３５には両端部に配置された係合ピン４３，４４が設けられ、前記可動レール３６の両端部には係合ピン４３，４４が突出する長孔４５，４６が形成されている。一方の長孔４５は水平であるが、他方の長孔４６は端部に向かうに従い次第に上方に向かうように傾斜されている（図３参照）。すなわち、固定レール３５に対して可動レール３６を光軸方向（矢印Ｘ方向）に変位させることにより、可動レール３６が係合ピン４３を支点として矢印Ｙ方向に回動する構造である。また、固定レール３５と可動レール３６とに形成された切り起し片４７，４８にはスプリング４９が張設されている。さらに、可動レール３６の一側には固定片５０に螺合された調整ねじ５１の先端に当接する突片５２が設けられている。すなわち、可動レール３６はスプリング４９により固定片５０側に付勢されているが突片５２と調整ねじ５１との当接により定位置に静止されている。

【００２７】しかして、前記光学ハウジング２の位置決めピン３９を保持する前記走査方向位置決め孔４０と、前記係合ピン４３，４４を有する前記固定レール３５と、前記係合ピン４３，４４に嵌合された長孔４５，４６を有する前記可動レール３６とにより、走査線の副走査方向における光学ハウジング２の傾き度を調整する副走査方向傾き調整手段５３が形成されている。さらに、光学ハウジング２の出射側の端部両側に対向されてレーザ光を受光するセンサ５４，５５が固定的に配設されている。

【００２８】図４及び図５に示すように、前記スライドレール３３と前記固定レール３５とは、レーザープリンタやデジタル複写機等の画像形成装置における同一のフレーム（支持部材）５６の両側にねじ結合されている。図４においては、スライドレール３３，３４は二段分しか図示していないが実際には四段分配設され、これにより、図６に示すように四つの光学ハウジング２が支持されるものである。また、図６に示すように、各光学ハウジング２の出射側には、それぞれ被走査面となる感光体５７が回転自在に設けられ、これらの感光体５７に接触する転写ベルト５８が回転自在に設けられている。図１を参照して説明した前記固定片５０はフレーム５６の一

部に固定的に設けられているものである。

【００２９】このような構成において、レーザ光源４から出射されたレーザ光は、ポリゴンミラー１２により走査され結像光学系７，８により感光体５７上に結像される。すなわち、感光体５７に静電潜像が形成される。この静電潜像は現像装置（図示せず）により現像された後に転写ベルト５８に転写され、この転写ベルト５８上の転写画像が転写用紙（図示せず）に転写される。

【００３０】ところで、光学ハウジング２の走査方向での位置決めを行う走査方向位置決め手段（走査方向位置決め孔４０）と、光学ハウジング２を光軸方向に摺動自在に支える案内手段３２（スライドレール３３，３４）と、光学ハウジング２の光軸方向への挿入時にこの光学ハウジング２の一部（背面位置２９の両側）に当接してこの光学ハウジング２の光軸方向の位置決めを行う光軸方向位置決め手段（光軸方向位置決め片４１）とを設けたことにより、光学ハウジング２を案内手段３２に沿わせて挿入するだけの容易な操作で、位置決めピン３９を走査方向位置決め孔４０に嵌合させて走査方向の位置決めを行うとともに、背面位置２９の両側をスライドレール３３，３４の光軸方向位置決め片４１に当接させて光軸方向の位置決めとを行うことが可能となる。

【００３１】その後は、光学ハウジング２の背面板２９の取付孔３１に通した取付ねじ３０をスライドレール３３，３４のねじ孔４２に螺合するだけの容易な作業で光学ハウジング２を固定することができる。このようなことは、複数の画像形成ステーションを有する画像形成装置において、個々の光走査装置１の位置決めを容易にすることができるので、組立調整作業を簡略化することが可能である。以上は請求項１記載の発明に対応する効果である。

【００３２】また、光学ハウジング２は、位置決めピン３９と走査方向位置決め孔４０との嵌合、スライドレール３３，３４の突起３７，３８と拡開片２６，２７との当接により３点で支えられるため安定する。そして、図１において、調整ねじ５１を締め込むと可動レール３６がＸ方向の一方に移動し、調整ねじ５１を弛めると可動レール３６がスプリング４９の付勢力によりＸ方向の他方に移動するが、係合ピン４４に係合する長孔４６がＸ方向に対して傾斜されているため、可動レール３６は手前側の係合ピン４３を支点として回動し、突起３８がＹ方向に上下動する。このような副走査方向傾き調整手段５３の操作により、走査線の副走査方向における光学ハウジング２の傾きを容易に調整することができる。

【００３３】また、一方のスライドレール３４の内の可動レール３６の位置を変えることにより光学ハウジング２の副走査方向の傾きが調整されるため、副走査方向傾き調整手段５３を少ない部品で構成することが可能となる。以上は請求２記載の発明に対応する効果である。

【００３４】さらに、一方のスライドレール３３の奥側

の近傍に光学ハウジング２の一側を光軸方向（Ｘ方向）に着脱自在及び光軸方向と直交するＹ方向に回動自在に保持して光学ハウジング２の走査方向の位置を定める走査方向位置決め手段（操作方向位置決め孔４０）を設け、他方のスライドレール３４の内の可動レール３６を光軸方向（Ｘ方向）と直交するＹ方向に変位自在に設けることにより、走査線の副走査方向における光学ハウジング２の傾きを調整する副走査方向傾き調整手段５３を構成したことにより、スライドレール３３，３４に沿って光学ハウジング２を挿入したときに光学ハウジング２の走査方向の位置が走査方向位置決め手孔４０により定められ、光学ハウジング２の自由端側を支えるスライドレール（可動レール３６）をＹ方向に変位させて光学ハウジング２を回動させるだけでの操作で、光学ハウジング２の副走査方向の傾きを容易に調整することができる。これは請求項３記載の発明に対応する効果である。

【００３５】さらに、光学ハウジング２の端部から出射されるレーザ光を検出するセンサとして、図７に示すように、受光面が走査線上で分割されるセンサ５４，５５を用いることにより、分割線から走査線が外れると分割線を境とする受光部からの出力１，２に変化が生ずる。そこで、光学ハウジング２の出射側の少なくとも自由端側（可動レール３６により支えられる側）に対向する位置にレーザ光を受光するセンサ５４を設け、このセンサ５４の出力により光学ハウジングの副走査方向の傾き度を演算手段（図示せず）により演算し、この演算手段の演算結果により副走査方向傾き調整手段５３の調整ねじ５１を駆動手段（図示しないがモータ）により回すことにより、被走査面（感光体５７）に形成した画像を再生しなくても、センサ５４からの出力に基づいて光学ハウジング２の傾き度を自動的に補正することができる。これは請求項４記載の発明に対応する効果である。

【００３６】もちろん、光学ハウジング２の出射側の両側にセンサ５４，５５を配設し、これらのセンサ５４，５５の出力が一致するように可動レール３６をＹ方向に変位させても、光学ハウジング２の副走査方向の傾き度を調整することができる。

【００３７】さらに、複数の被走査面（感光体５７）の数に対応させて複数組み光学ハウジングを並設するとき、上述したような走査方向位置決め手段（走査方向位置決め孔４０）、対をなすスライドレール３３，３４よりなる案内手段３２、光軸方向位置決め手段（光軸方向位置決め片４１）、一方のスライドレール３４（可動レール３６）を変位させるようにした副走査方向傾き調整手段５３を、それぞれ同一の支持部材（図５中、フレーム５６）により支持したことにより、複数の画像形成ステーションを有する画像形成装置を製作する場合に、それぞれの画像形成ステーションに配置される光学ハウジング２の相対位置の精度を高めることができる。これにより、高品位の画像の出力が可能である。これは請求項

５記載の発明に対応する効果である。

【００３８】さらに、複数の画像形成ステーション毎に光学ハウジング２の出射側の両側に１ライン毎の走査開始位置と走査終了位置とを光学的に検出するために左右一対センサ５４，５５（図１参照）が配設されているため、これらのセンサ５４，５５の出力に基づいて各光学ハウジング２の副走査方向の傾き度を知ることができる。すなわち、各光学ハウジング２の出射側の両側にセンサ５４，５５を配設した場合、図８（ａ）に示すように、ステーション１の光学ハウジング２から出射された走査線に対してステーション２の走査線が傾斜しているときには、図８（ｂ）に示すように、各ステーション毎の走査開始を示すセンサ５４の出力の時間差ｔに対して走査終了を示すセンサ５５の出力の時間差ｔにΔｔの誤差が検出されるので、この結果により副走査方向の光学ハウジング２の傾き度を知ることができる。

【００３９】したがって、センサ５４，５５の出力を演算手段（図示せず）により演算し、この演算結果により各光学ハウジング２に対応する副走査方向傾き調整手段５３の調整螺子５１を図示しない駆動手段（モータ）で回すことにより、光学ハウジング２の相対的な傾き度を自動的に補正することができる。また、各光学ハウジング２の出射側に左右一対のセンサ５４，５５に代わるラインセンサ（図示せず）を配設し、これらのラインセンサにより１ラインの走査開始位置及び走査終了位置を検出し、その検出結果に基づいて光学ハウジング２の副走査方向の傾き度を調整するようにしてもよい。以上は請求項６記載の発明に対応する効果である。

【００４０】さらに、上述したような光学ハウジング２を画像形成ステーション毎に複数個並設した場合、図９に示すように、各光学ハウジング２毎に設けたポリゴンモータ１１を、同一発振源からの基準クロックを分周器５９で分周したパルスをもって駆動する。この場合、走査速度切替手段である分周比切替手段６０により分周比を切り替えることにより、形成すべき画像の倍率を補正することができる。これにより、光学ハウジング２をスライドレール３３，３４の光軸位置決め片４１に当接させて光軸方向の位置を定めているが、光学ハウジング２相互の光軸方向の位置にバラツキが生じたとしても、各画像形成ステーションの倍率を一定にすることができる。これは請求項７記載の発明に対応する効果である。

【００４１】また、各光学ハウジング２１ライン毎の走査開始時と走査終了時との時間差をセンサ５４，５５或いはこれに代わるラインセンサの出力により検出し、その検出結果に応じて分周比切替手段６０の動作を制御することにより、画像の倍率補正を自動的に行わせることができる。これは請求項８記載の発明に対応する効果である。

【００４２】

【発明の効果】請求項１記載の発明は、光学ハウジングの走査方向での位置決めを行う走査方向位置決め手段と、光学ハウジングを光軸方向に摺動自在に支える案内手段と、光学ハウジングの光軸方向への挿入時にこの光学ハウジングの一部に当接してこの光学ハウジングの光軸方向の位置決めを行う光軸方向位置決め手段とを設けたので、光学ハウジングを案内手段に沿わせて挿入するだけの容易な操作で走査方向の位置決めと光軸方向の位置決めとを行うことができ、この後はねじ等による止着作業だけで光学ハウジングを定位置に固定することができ、これにより、複数の画像形成ステーションを有する画像形成装置において、個々の光走査装置の位置決めを容易にすることができる。

【００４３】請求項２記載の発明は、請求項１記載の発明において、光学ハウジングの両側を摺動自在に保持する左右一対のスライドレールにより案内手段を形成し、スライドレールの一方を光軸方向と直交する方向に変位自在に設けることにより走査線の副走査方向における光学ハウジングの傾きを調整する副走査方向傾き調整手段を構成したので、一方のスライドレールの位置を変えることにより光学ハウジングの副走査方向の傾きを調整することができ、したがって、副走査方向傾き調整手段を少ない部品で構成することができる。

【００４４】請求項３記載の発明は、請求項２記載の発明において、左右一対のスライドレールの一方の奥側の近傍に光学ハウジングの一側を光軸方向に着脱自在及び光軸方向と直交する方向に回動自在に保持して光学ハウジングの走査方向の位置を定める走査方向位置決め手段を設け、光学ハウジングの自由端側を支える他方のスライドレールを光軸方向と直交する方向に変位自在に設けることにより走査線の副走査方向における光学ハウジングの傾きを調整する副走査方向傾き調整手段を構成したので、スライドレールに沿って光学ハウジングを挿入したときに光学ハウジングの走査方向の位置を走査方向位置決め手段により定め、光学ハウジングの自由端側を支えるスライドレールを変位させて光学ハウジングを回動させるだけでの操作で、光学ハウジングの副走査方向の傾きを調整することができる。

【００４５】請求項４記載の発明は、請求項３記載の発明において、光学ハウジングの出射側の少なくとも自由端側に対向する位置にレーザ光を受光するセンサと、このセンサの出力により光学ハウジングの副走査方向の傾き度を演算する演算手段と、この演算手段による演算結果に基づいて副走査方向傾き調整手段を駆動する駆動手段とを設けたので、被走査面にレーザ光を結像した結果を再生しなくても、センサからの出力に基づいて光学ハウジングの傾き度を自動的に補正することができる。

【００４６】請求項５記載の発明は、被走査面の数に対応させて複数組み光学ハウジングを並設するとき、請求項３記載の走査方向位置決め手段と案内手段と光軸方向位置決め手段と副走査方向傾き調整手段とを、それぞれ

同一の支持部材により支持したので、複数の画像形成ステーションを有する画像形成装置を製作する場合に、それぞれの画像形成ステーションに配置される光学ハウジングの相対位置の精度を高めて高品位の画像の出力が可能となる。

【００４７】請求項６記載の発明は、請求項５記載の発明において、各光学ハウジングの１ライン毎の走査開始位置と走査終了位置とを光学的に検出するセンサと、これらのセンサの出力に基づいて各光学ハウジングの副走査方向の傾き度を演算する演算手段と、この演算手段による演算結果に基づいて各光学ハウジングに対応する副走査方向傾き調整手段を駆動する駆動手段とを設けたので、各センサの出力に基づいて副走査傾き調整手段を駆動して各光学ハウジングの傾きを調整することにより、被走査面にレーザ光を結像した結果を再生しなくても、各光学ハウジングの相対的な傾き度を自動的に補正することができる。

【００４８】請求項７記載の発明は、請求項１記載の発明において、レーザ光源と、このレーザ光源から出射されたレーザ光を偏向する偏向手段と、この偏向手段により偏向されたレーザ光を被走査面に結像する結像光学系とが装着された光学ハウジングを複数個並設し、これらの光学ハウジング内の偏向手段はそれぞれの走査速度切替手段を具備したので、個々の光学ハウジングの光軸方向の位置にバラツキが生じたとしても、偏向手段の走査速度を変えることにより、形成される画像の倍率を一定に補正することができ、これにより、光軸方向に挿入された光学ハウジングを当接させるだけの簡単な構造で光軸方向位置決め手段を構成することができる。

【００４９】請求項８記載の発明は、請求項７記載の発明において、各光学ハウジングの１ライン毎の走査開始位置と走査終了位置とを光学的に検出するセンサを設け、これらのセンサが検出する走査開始時と走査終了時との時間差に基づいて走査速度切替手段を作動させるようにしたので、個々の光学ハウジングの光軸方向の位置にバラツキが生じたとしても、センサの出力に基づいて偏向手段の走査速度を変えることにより、形成される画像の倍率を自動的に一定に補正することができる。

【図面の簡単な説明】

【図１】本発明の一実施例における光学ハウジングと支持装置との関係を示す分解斜視図である。

【図２】光学ハウジングの内部の部品配置を示す分解斜視図である。

【図３】副走査方向傾き調整手段の構成を示す縦断側面図である。

【図４】スライドレールの支持構造を示す正面図である。

【図５】スライドレールの支持構造を示す平面図である。

【図６】画像形成ステーション毎に光学ハウジングを配設した状態を示す縦断側面図である。

【図７】センサを示す正面図である。

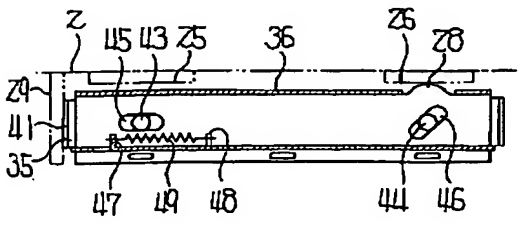
【図８】（ａ）は画像形成ステーション毎に形成される走査線の説明図、（ｂ）はセンサの出力を示すタイミングチャートである。

【図９】ポリゴンモータの駆動回路を示すブロック図である。

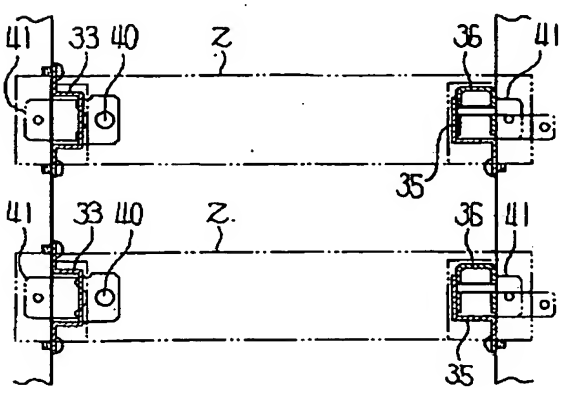
【符号の説明】

２	光学ハウジング
４	レーザ光源
６	偏向手段
７，８	結像光学系
３２	案内手段
３３，３４	スライドレール
４０	走査方向位置決め手段
４１	光軸方向位置決め手段
５３	副走査方向傾き調整手段
５４，５５	センサ
５６	支持部材
５７	被走査面
６０	走査速度切替手段

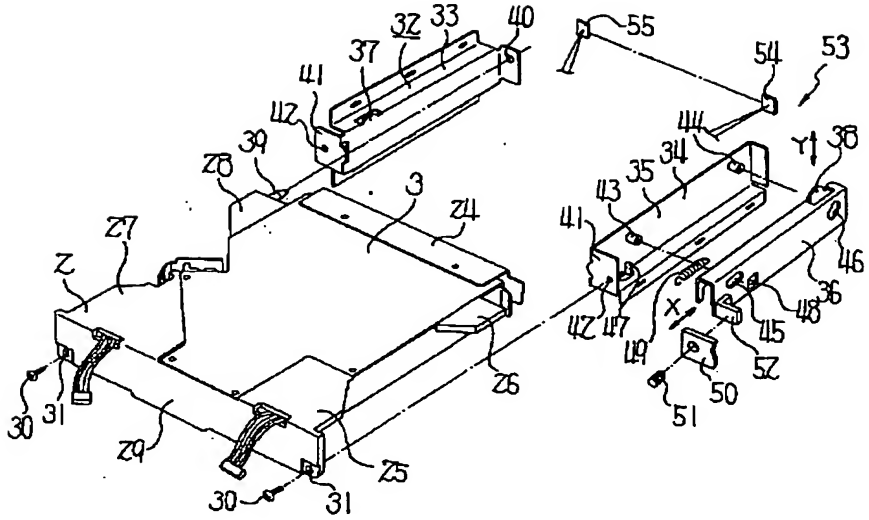
【図３】



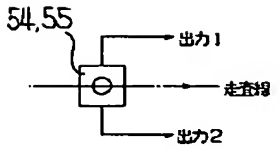
【図４】



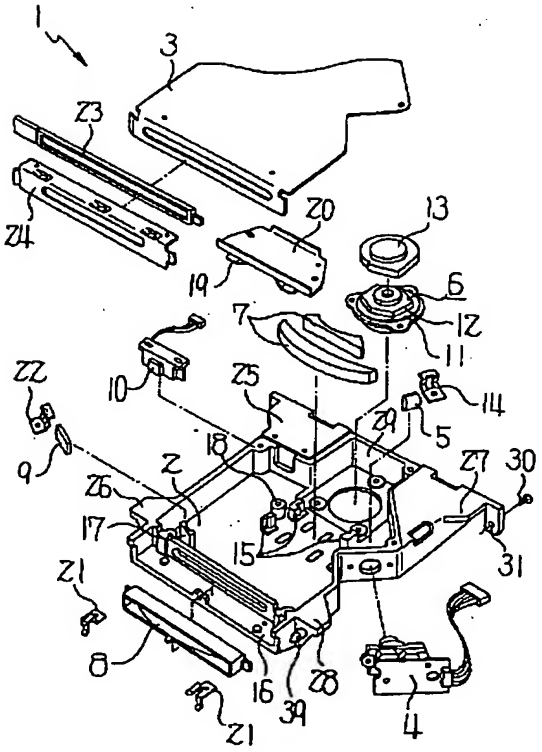
【図１】


40
33
32
37
41
42
39
28
3
24
27
2
26
30
31
29
25
55
54
53
44
34
38
35
43
41
46
36
48
45
47
49
52
50
51
X
Y

【図７】


54,55
出力1
基準線
出力2

【図２】


1
3
23
24
20
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19
6
7
12
11
22
10
25
14
9
18
5
2
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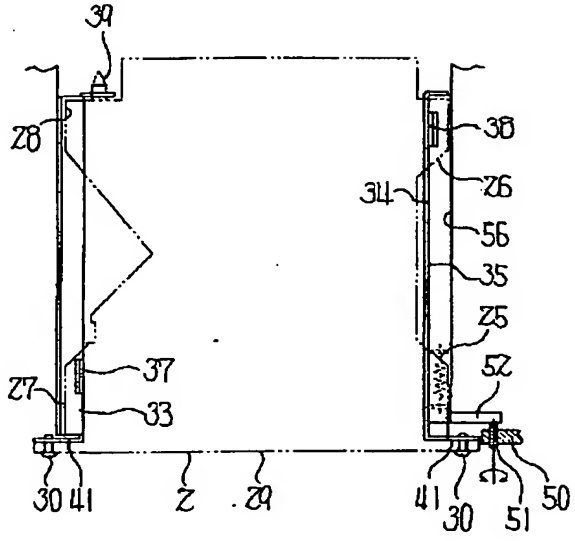
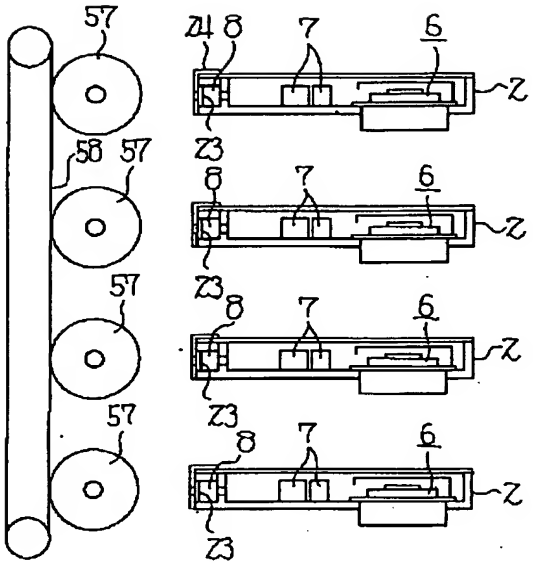
30
17
15
31
21
8
16
28
39
4

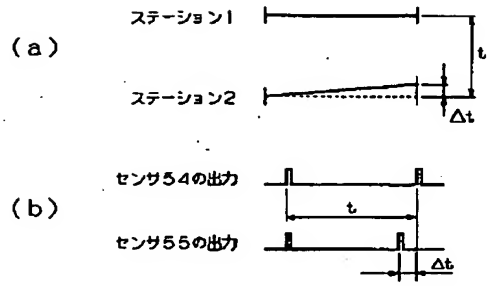
【図５】


39
28
38
34
26
56
35
25
52
27
37
33
30
41
2
29
41
30
51
50

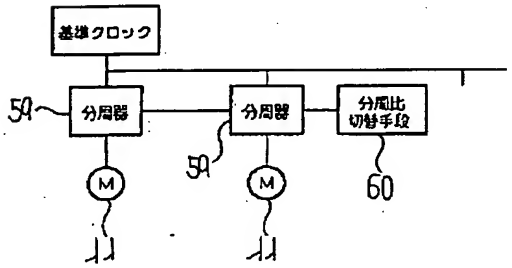
【図６】


57
21
8
7
6
Z
Z3
58
57
57
57

【図８】


(a)
ステーション1
ステーション2
t
Δt
(b)
センサ54の出力
センサ55の出力
t
Δt

【図９】


基準クロック
50
分周器
分周器
分周比
切替手段
50
60
M
M

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] A laser light source and the deflection means which deflects the laser beam by which outgoing radiation was carried out from this laser light source, A scanning direction positioning means to prepare optical housing with which it was equipped with the image formation optical system which carries out image formation of the laser beam deflected by this deflection means to a scan layer-ed, and to perform positioning in the scanning direction of said optical housing, The guidance means which supports said optical housing for the direction of an optical axis, enabling free sliding, Means for supporting of the light-scanning equipment characterized by establishing a direction positioning means of an optical axis to position the direction of an optical axis of this optical housing in contact with a part of this optical housing at the time of insertion in the direction of an optical axis of said optical housing.
[Claim 2] Means for supporting of the light-scanning equipment according to claim 1 characterized by constituting the direction inclination adjustment device of vertical scanning which adjusts the inclination of said optical housing in the direction of vertical scanning of the scanning line by forming a guidance means with the slide rail of a Uichi Hidari pair which holds the both sides of optical housing free [sliding], and preparing one side of said slide rail in the direction of an optical axis, and the direction which intersects perpendicularly free [displacement].
[Claim 3] A scanning direction positioning means to hold the 1 side of optical housing in the direction of an optical axis near one back side of the slide rail of a Uichi Hidari pair free [attachment and detachment] and free [rotation in the direction of an optical axis and the direction which intersects perpendicularly], and to define the location of the scanning direction of said optical housing is established. By preparing the slide rail of another side supporting free one end of said optical housing in the direction of an optical axis, and the direction which intersects perpendicularly free [displacement] Means for supporting of the light-scanning equipment according to claim 2 characterized by constituting the direction inclination adjustment device of vertical scanning which adjusts the inclination of said optical housing in the direction of vertical scanning of the scanning line.
[Claim 4] Means for supporting of the light-scanning equipment according to claim 3 characterized by preparing the sensor which receives a laser beam, an operation means to calculate whenever [inclination / of the direction of vertical scanning of said optical housing] with the output of this sensor, and the driving means which drives the direction inclination adjustment device of vertical scanning based on the result of an operation by this operation means in the location by the side of the outgoing radiation of optical housing which counters free one end at least.
[Claim 5] Means for supporting of the light-scanning equipment characterized by supporting a scanning direction positioning means and a guidance means according to claim 3, the direction positioning means of an optical axis, and the direction inclination adjustment device of vertical scanning by the respectively same supporter material when making the number of scan layers-ed correspond, constructing more than one and installing optical housing.
[Claim 6] Means for supporting of the light-scanning equipment according to claim 5 characterized by to establish the sensor which detects optically the scan starting position and the scan termination

location in every line of each optical housing, an operation means calculate whenever [inclination / of the direction of vertical scanning of each of said optical housing] based on the output of these sensors, and the driving means which drives the direction inclination adjustment device of vertical scanning corresponding to said each optical housing based on the result of an operation by this operation means.
[Claim 7] They are the means for supporting of the light-scanning equipment according to claim 1 which installs two or more optical housing with which it was equipped with a laser light source, the deflection means which deflects the laser beam by which outgoing radiation was carried out from this laser light source, and the image formation optical system which carries out image formation of the laser beam deflected by this deflection means to a scan layer-ed, and is characterized by said deflection means in these optical housing possessing each scan speed change means.
[Claim 8] Means for supporting of the light-scanning equipment according to claim 7 characterized by making it operate a scan speed change means based on time difference with the time of the scan initiation which forms the sensor which detects optically the scan starting position and scan termination location in every line of each optical housing, and these sensors detect, and scan termination.

[Translation done.]

* NOTICES *

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3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the means for supporting of the light-scanning equipment of a deviation scanning-type which scans a laser beam to a scan layer-ed in image formation equipments, such as a laser beam printer and a digital copier.
[0002]
[Description of the Prior Art] Conventionally, optical housing with which it was equipped with a laser light source, the deflection means which has a polygon mirror, and image formation optical system is prepared, and while deflecting the laser beam by which outgoing radiation was carried out from a laser light source by the deflection means, there is light-scanning equipment which was made to carry out image formation to scan layers-ed, such as a photo conductor, with an image formation means.
[0003] Such optical housing of light-scanning equipment has an installation side used as the datum clamp face of the polygon motor used as one component part of a deflection means, or image formation optical system, and the structure which lays this installation side in the frame structure, and is attached from a perpendicular direction is adopted in many cases. In the case of the image formation equipment which needs two or more light-scanning equipments like color picture formation equipment, it has accumulated by the approach which mentioned optical housing above. Although it is necessary to adjust correctly the relative relation between each light-scanning equipment and a scan layer-ed in order to satisfy image quality, tuning becomes large-scale [an adjustment device] difficult under effects of rigid, such as optical housing and a frame. In order to form a color picture especially, in the case of the image formation equipment which arranges light-scanning equipment for two or more image formation stations of every, structure becomes very large-scale.
[0004]
[Problem(s) to be Solved by the Invention] Then, although the proposal which amends the gap of an image to the image formation station used as criteria by the approach of reading a transfer picture, and changing the timing of the image beginning, or changing the include angle of a clinch mirror with an actuator is made as indicated by JP,4-131872,A and JP,4-131876,A, in order to carry out the variation rate of the mirror, two or more actuators are needed for every light-scanning equipment, and structure is complicated.
[0005]
[Means for Solving the Problem] The deflection means to which invention according to claim 1 deflects the laser beam by which outgoing radiation was carried out from a laser light source and this laser light source, A scanning direction positioning means to prepare optical housing with which it was equipped with the image formation optical system which carries out image formation of the laser beam deflected by this deflection means to a scan layer-ed, and to perform positioning in the scanning direction of said optical housing, They are the means for supporting of light-scanning equipment about having established the guidance means which supports said optical housing for the direction of an optical axis, enabling free sliding, and a direction positioning means of an optical axis to position the direction of an

optical axis of this optical housing in contact with a part of this optical housing at the time of insertion in the direction of an optical axis of said optical housing.

[0006] Invention according to claim 2 is the means for supporting of the light-scanning equipment which constituted the direction inclination adjustment device of vertical scanning which adjusts the inclination of said optical housing in the direction of vertical scanning of the scanning line in invention according to claim 1 by forming a guidance means with the slide rail of a Uichi Hidari pair which holds the both sides of optical housing free [sliding], and preparing one side of said slide rail in the direction of an optical axis, and the direction which intersects perpendicularly free [displacement].

[0007] Invention according to claim 3 is set to invention according to claim 2. A scanning direction positioning means to hold the 1 side of optical housing in the direction of an optical axis near one back side of the slide rail of a Uichi Hidari pair free [attachment and detachment] and free [rotation in the direction of an optical axis and the direction which intersects perpendicularly], and to define the location of the scanning direction of said optical housing is established. They are the means for supporting of the light-scanning equipment which constituted the direction inclination adjustment device of vertical scanning which adjusts the inclination of said optical housing in the direction of vertical scanning of the scanning line by preparing the slide rail of another side supporting free one end of said optical housing in the direction of an optical axis, and the direction which intersects perpendicularly free [displacement].

[0008] Invention according to claim 4 is the means for supporting of the light-scanning equipment which established the sensor which receives a laser beam in the location by the side of the outgoing radiation of optical housing which counters free one end at least, an operation means to calculate whenever [inclination / of the direction of vertical scanning of said optical housing] with the output of this sensor, and the driving means which drives the direction inclination adjustment device of vertical scanning based on the result of an operation by this operation means in invention according to claim 3.

[0009] Invention according to claim 5 is the means for supporting of the light-scanning equipment which supported a scanning direction positioning means and a guidance means according to claim 3, the direction positioning means of an optical axis, and the direction inclination adjustment device of vertical scanning by the respectively same supporter material, when making the number of scan layers-ed correspond, constructing [two or more] and installing optical housing.

[0010] The sensor by which invention according to claim 6 detects optically the scan starting position and scan termination location in every line of each optical housing in invention according to claim 5, They are the means for supporting of the light-scanning equipment which established an operation means to calculate whenever [inclination / of the direction of vertical scanning of each of said optical housing] based on the output of these sensors, and the driving means which drives the direction inclination adjustment device of vertical scanning corresponding to said each optical housing based on the result of an operation by this operation means.

[0011] Invention according to claim 7 installs two or more optical housing with which it was equipped with the image formation optical system which carries out image formation of the laser beam deflected by a laser light source, the deflection means which deflects the laser beam by which outgoing radiation was carried out from this laser light source, and this deflection means in invention according to claim 1 to a scan layer-ed, and said deflection means in these optical housing are the means for supporting of the light-scanning equipment possessing each scan speed change means.

[0012] Invention according to claim 8 is the means for supporting of the light-scanning equipment it was made to operate a scan speed change means based on time difference with the time of the scan initiation which forms the sensor which detects optically the scan starting position and scan termination location in every line of each optical housing, and these sensors detect, and scan termination in invention according to claim 7.

[0013]

[Function] According to invention according to claim 1, it becomes possible to make optical housing meet a guidance means and to perform positioning of a scanning direction, and positioning of the direction of an optical axis by the easy actuation to insert.

[0014] Since the inclination of the direction of vertical scanning of optical housing is adjusted by changing the location of one slide rail according to invention according to claim 2, it becomes possible to constitute the direction inclination adjustment device of vertical scanning from few components.
[0015] According to invention according to claim 3, when optical housing is inserted along with a slide rail, the inclination of the direction of vertical scanning of optical housing is adjusted by actuation only by the location of the scanning direction of optical housing being defined by the scanning direction positioning means, carrying out the variation rate of the slide rail supporting free one end of optical housing, and rotating optical housing.
[0016] According to invention according to claim 4, even if it does not reproduce the result of having carried out image formation of the laser beam to the scan layer-ed, based on the output from a sensor, whenever [inclination / of optical housing] is amended automatically.
[0017] When manufacturing the image formation equipment which has two or more image formation stations according to invention according to claim 5, the precision of the relative position of optical housing arranged at each image formation station is raised.
[0018] According to invention according to claim 6, even if it does not reproduce the result of having carried out image formation of the laser beam to the scan layer-ed by detecting the difference of the light-receiving starting position of each sensor, and a light-receiving termination location, driving a vertical-scanning inclination adjustment device, and adjusting the inclination of each optical housing, whenever [relative inclination / of each optical housing] is amended automatically.
[0019] According to invention according to claim 6, even if it does not reproduce the result of having carried out image formation of the laser beam to the scan layer-ed by driving a vertical-scanning inclination adjustment device based on the output of each sensor, and adjusting the inclination of each optical housing, whenever [relative inclination / of each optical housing] is amended automatically.
[0020] According to invention according to claim 7, even if variation arises in the location of the direction of an optical axis of each optical housing, the scale factor of the image formed is uniformly amended by changing the scan speed of a deflection means.
[0021] According to invention according to claim 8, even if variation arises in the location of the direction of an optical axis of each optical housing, the scale factor of the image formed is automatically amended uniformly by changing the scan speed of a deflection means based on the output of a sensor.
[0022]
[Example] One example of this invention is explained based on a drawing. First, the configuration of light-scanning equipment 1 is described with reference to drawing 2 . 2 is flat optical housing and the effective area of the top face of this optical housing 2 is blockaded with covering 3. The laser light source 4 which carries out collimator lens (not shown) built-in at the optical housing 2, The SHIRIN dollar cull lens 5 and the deflection means 6 which deflects the laser beam which outgoing radiation was carried out from the laser light source 4, and passed along the SHIRIN dollar cull lens 5, The image formation optical system 7 and 8 which carries out image formation to the scan layer-ed which mentions later the laser beam deflected by this deflection means 6, The synchronous detection sensor (photo detector) 10 which sets up the output timing of the picture signal from a laser light source 4 is held by receiving the reflected light from the mirror 9 which reflects the laser beam outside an image write-in field, and this mirror 9. Said deflection means 6 leaves that part, and consists of a wrap sound hood 13 the polygon motor 11 fixed to said housing 2, the polygon mirror 12 directly linked with this polygon motor 11, and this polygon mirror 12.
[0023] Said SHIRIN dollar cull lens 5 is being pressed and fixed to the positioning section (not shown) formed in the base of said optical housing 2 of flat spring 14. Moreover, two or more positioning sections 15, 16, and 17 and bosses 18 are formed in the optical housing 2. And the supporter material 20 which has the flat spring 19 which presses said image formation optical system 7 (ftheta lens) in the positioning section 15 is attached in a boss 18, the image formation optical system 8 (toroidal lens) is pressed by the positioning section 16 by flat spring 21, and is positioned, and a mirror 9 is pressed by the positioning section 17 by flat spring 22, and is positioned. Furthermore, the attachment component 24 held for the protection-against-dust plate 23, enabling free attachment and detachment is attached in

said covering 3. Furthermore, the pieces 25, 26, 27, and 28 of extension and the tooth-back plate 29 which are extended from both sides are formed in said optical housing 2, and the mounting hole 31 where a mounting screw 30 is inserted is formed in it at the both sides of this tooth-back plate 29.
[0024] Subsequently, as shown in drawing 1 , a guidance means 32 to guide said optical housing 2 in the direction of an optical axis free [sliding] is established. This guidance means 32 is formed with the slide rails 33 and 34 of a Uichi Hidari pair. One slide rail 34 has the fixed rail 35 and a movable rail 36, the projection 37 which lays said piece 27 of extension is formed in the top face of the slide rail 33, and the projection 38 supporting said piece 26 of extension is formed in the top face of a movable rail 36.
[0025] And the scanning direction tooling holes 40 which are scanning direction positioning means to define the location of the scanning direction of this optical housing 2 are formed by carrying out fitting of the locator pin 39 set up by the edge of one side of said optical housing 2 to the end of said slide rail 33. Furthermore, the piece 41 of the direction positioning of an optical axis which defines the location of the direction of an optical axis of this optical housing 2 by making the both-sides section of said tooth-back plate 29 of the optical housing 2 contact and which is the direction positioning means of an optical axis is formed in the edge of the slide rail 33 and the fixed rail 35, and the **** hole 42 with which said mounting screw 30 is screwed is formed in these pieces 41 of the direction positioning of an optical axis.

[0026] Furthermore, the engagement pins 43 and 44 arranged to both ends are formed in said fixed rail 35, and the long holes 45 and 46 in which the engagement pins 43 and 44 project are formed in the both ends of said movable rail 36. Although one long hole 45 is level, the long hole 46 of another side inclines so that it may go up gradually, as it goes to an edge (refer to drawing 3). That is, it is the structure which a movable rail 36 rotates in the direction of arrow-head Y by using the engagement pin 43 as the supporting point by making the variation rate of the movable rail 36 carry out in the direction of an optical axis (the direction of arrow-head X) to the fixed rail 35. Moreover, it was formed in the fixed rail 35 and the movable rail 36, and starts, and the spring 49 is stretched by pieces 47 and 48. Furthermore, the protruding piece 52 which contacts at the tip of the adjusting screw 51 screwed in the fixed piece 50 is formed in the 1 side of a movable rail 36. That is, although the movable rail 36 is energized with the spring 49 at the fixed piece 50 side, it is at a standstill in the orientation with the contact to a protruding piece 52 and an adjusting screw 51.
[0027] A deer is carried out and the direction inclination adjustment device 53 of vertical scanning which adjusts whenever [inclination / of the optical housing 2 in the direction of vertical scanning of the scanning line] with said scanning direction tooling holes 40 holding the gage pin 39 of said optical housing 2, said fixed rail 35 which has said engagement pins 43 and 44, and said movable rail 36 which has the long holes 45 and 46 by which fitting was carried out to said engagement pins 43 and 44 is formed. Furthermore, the sensors 54 and 55 which counter the edge both sides by the side of the outgoing radiation of the optical housing 2, and receive a laser beam are arranged fixed.
[0028] As shown in drawing 4 and drawing 5 , said slide rail 33 and said fixed rail 35 are ****ed and combined with the both sides of the same frame (supporter material) 56 in image formation equipments, such as a laser beam printer and a digital copier. In drawing 4 , although the slide rails 33 and 34 are illustrating only two steps, they are arranged by four steps in fact, and thereby, as shown in drawing 6 , four optical housing 2 is supported. Moreover, as shown in drawing 6 , it is prepared free [rotation of the photo conductor 57 which serves as a scan layer-ed, respectively], and the imprint belt 58 in contact with these photo conductors 57 is formed in the outgoing radiation side of each optical housing 2 free [rotation]. Said fixed piece 50 explained with reference to drawing 1 is formed fixed in a part of frame 56.
[0029] In such a configuration, the laser beam by which outgoing radiation was carried out from the laser light source 4 is scanned by the polygon mirror 12, and image formation is carried out by the image formation optical system 7 and 8 on a photo conductor 57. That is, an electrostatic latent image is formed in a photo conductor 57. After this electrostatic latent image is developed by the developer (not shown), it is imprinted by the imprint belt 58, and the transfer picture on this imprint belt 58 is imprinted by the imprint form (not shown).

[0030] By the way, a scanning direction positioning means to perform positioning in the scanning direction of the optical housing 2 (scanning direction tooling holes 40), The guidance means 32 (slide rails 33 and 34) which supports the optical housing 2 for the direction of an optical axis, enabling free sliding, By having established a direction positioning means of an optical axis (piece 41 of the direction positioning of an optical axis) to position the direction of an optical axis of this optical housing 2 in contact with a part of this optical housing 2 (both sides of the tooth-back location 29) at the time of insertion in the direction of an optical axis of the optical housing 2 The optical housing 2 is made to meet the guidance means 32. By the easy actuation to insert While carrying out fitting of the gage pin 39 to the scanning direction tooling holes 40 and positioning a scanning direction, it becomes possible to make the both sides of the tooth-back location 29 contact the piece 41 of the direction positioning of an optical axis of the slide rails 33 and 34, and to perform positioning of the direction of an optical axis.
[0031] After that, the optical housing 2 is fixable by the easy activity which screws in the screw-thread hole 42 of the slide rails 33 and 34 the mounting screw 30 which it let pass to the mounting hole 31 of the tooth-back plate 29 of the optical housing 2. In the image formation equipment which has two or more image formation stations, since positioning of each light-scanning equipment 1 can be made easy, such a thing can simplify a rigging activity. The above is the effectiveness corresponding to invention according to claim 1.
[0032] Moreover, since the optical housing 2 supports by three points by the contact to projections 37 and 38 and the pieces 26 and 27 of extension of fitting of a gage pin 39 and the scanning direction tooling holes 40, and the slide rails 33 and 34, it is stabilized by it. And in drawing 1 R> 1, if an adjusting screw 51 is fastened, a movable rail 36 will move to one side of the direction of X, if an adjusting screw 51 is loosened, a movable rail 36 will move to another side of the direction of X according to the energization force of a spring 49, but since the long hole 46 which engages with the engagement pin 44 inclines to the direction of X, a movable rail 36 rotates the engagement pin 43 of a near side as the supporting point, and projection 38 moves up and down in the direction of Y. Actuation of such a direction inclination adjustment device 53 of vertical scanning can adjust easily the inclination of the optical housing 2 in the direction of vertical scanning of the scanning line.
[0033] Moreover, since the inclination of the direction of vertical scanning of the optical housing 2 is adjusted by changing the location of the movable rail 36 of one slide rails 34, it becomes possible to constitute the direction inclination adjustment device 53 of vertical scanning from few components. The above is the effectiveness corresponding to invention of claim 2 publication.
[0034] Furthermore, a scanning direction positioning means (the actuation direction tooling holes 40) to hold the 1 side of the optical housing 2 in the direction of an optical axis (the direction of X) near the back side of one slide rail 33 free [attachment and detachment] and free [rotation in the direction of Y which intersects perpendicularly with the direction of an optical axis], and to define the location of the scanning direction of the optical housing 2 is established. By forming the movable rail 36 of the slide rails 34 of another side in the direction of Y which intersects perpendicularly with the direction of an optical axis (the direction of X) free [displacement] By having constituted the direction inclination adjustment device 53 of vertical scanning which adjusts the inclination of the optical housing 2 in the direction of vertical scanning of the scanning line When the optical housing 2 is inserted along with the slide rails 33 and 34, the location of the scanning direction of the optical housing 2 is defined with the scanning direction location conclusive factor hole 40. By actuation only by making the variation rate of the slide rail (movable rail 36) supporting free one end of the optical housing 2 carry out in the direction of Y, and rotating the optical housing 2, the inclination of the direction of vertical scanning of the optical housing 2 can be adjusted easily. This is the effectiveness corresponding to invention according to claim 3.
[0035] Furthermore, if the scanning line separates from a parting line by using the sensors 54 and 55 by which a light-receiving side is divided on the scanning line as a sensor which detects the laser beam by which outgoing radiation is carried out from the edge of the optical housing 2 as shown in drawing 7 , change will arise from the light sensing portion bordering on a parting line to outputs 1 and 2. Then, the sensor 54 which receives a laser beam is formed in the location by the side of the outgoing radiation of

the optical housing 2 which counters at least free one end (side supported with a movable rail 36). Whenever [inclination / of the direction of vertical scanning of optical housing] is calculated with an operation means (not shown) by the output of this sensor 54. By turning the adjusting screw 51 of the direction inclination adjustment device 53 of vertical scanning by the driving means (although not illustrated motor), by the result of an operation of this operation means Even if it does not reproduce the image formed in the scan layer-ed (photo conductor 57), based on the output from a sensor 54, whenever [inclination / of the optical housing 2] can be amended automatically. This is the effectiveness corresponding to invention according to claim 4.

[0036] Of course, sensors 54 and 55 are arranged in the both sides by the side of the outgoing radiation of the optical housing 2, and even if it makes the variation rate of the movable rail 36 carry out in the direction of Y so that the output of these sensors 54 and 55 may be in agreement, whenever [inclination / of the direction of vertical scanning of the optical housing 2] can be adjusted.

[0037] Furthermore, when making the number of two or more scan layers-ed (photo conductor 57) correspond, constructing more than one and installing optical housing, A scanning direction positioning means which was mentioned above (scanning direction tooling holes 40), The guidance means 32, the direction positioning means of an optical axis (piece 41 of the direction positioning of an optical axis) which consist of slide rails 33 and 34 which make a pair, The direction inclination adjustment device 53 of vertical scanning to which it was made to carry out the variation rate of one slide rail 34 (movable rail 36) by having supported by the respectively same supporter material (the inside of drawing 5 , frame 56) When manufacturing the image formation equipment which has two or more image formation stations, the precision of the relative position of the optical housing 2 arranged at each image formation station can be raised. The output of a high-definition image by this is possible. This is the effectiveness corresponding to invention according to claim 5.

[0038] Furthermore, since the Uichi Hidari pair sensors 54 and 55 (refer to drawing 1) are arranged in order to detect optically the scan starting position and scan termination location in every line for two or more image formation stations of every on both sides by the side of the outgoing radiation of the optical housing 2, based on the output of these sensors 54 and 55, whenever [inclination / of the direction of vertical scanning of each optical housing 2] can be known. Namely, when sensors 54 and 55 are arranged in the both sides by the side of the outgoing radiation of each optical housing 2, as shown in drawing 8 (a) When the scanning line of a station 2 inclines from the optical housing 2 of a station 1 to the scanning line by which outgoing radiation was carried out Since the error of deltat is detected by the time difference t of the output of the sensor 55 in which scan termination is shown to the time difference t of the output of the sensor 54 in which the scan initiation for every station is shown as shown in drawing 8 (b), whenever [inclination / of the optical housing 2 of the direction of vertical scanning] can be known by this result.

[0039] Therefore, whenever [relative inclination / of the optical housing 2] can be automatically amended by calculating the output of sensors 54 and 55 with an operation means (not shown), and turning by the driving means (motor) which does not illustrate the adjustment screw 51 of the direction inclination adjustment device 53 of vertical scanning corresponding to each optical housing 2 by this result of an operation. Moreover, the line sensor (not shown) which replaces the sensors 54 and 55 of a Uichi Hidari pair is arranged in the outgoing radiation side of each optical housing 2, these line sensors detect the scan starting position of one line, and a scan termination location, and you may make it adjust whenever [inclination / of the direction of vertical scanning of the optical housing 2] based on the detection result. The above is the effectiveness corresponding to invention according to claim 6.

[0040] Furthermore, when two or more optical housing 2 which was mentioned above is installed for every image formation station, as shown in drawing 9 , the polygon motor 11 formed every optical housing 2 is driven with the pulse which carried out dividing of the reference clock from the source of the same oscillation with the counting-down circuit 59. In this case, the scale factor of the image which should be formed can be amended by changing a division ratio with the division ratio change means 60 which is a scan speed change means. Although the optical housing 2 was made to contact the piece 41 of optical-axis positioning of the slide rails 33 and 34 and the location of the direction of an optical axis is

defined by this, even if variation arises in the location of the direction of an optical axis between optical housing 2, the scale factor of each image formation station can be made regularity. This is the effectiveness corresponding to invention according to claim 7.

[0041] Moreover, scale-factor amendment of an image can be made to perform automatically by the output of the line sensor which replaces time difference with the time of the scan initiation for every optical housing of 21 lines and scan termination with sensors 54 and 55 or this detecting, and controlling actuation of the division ratio change means 60 according to the detection result. This is the effectiveness corresponding to invention according to claim 8.

[0042]

[Effect of the Invention] A scanning direction positioning means by which invention according to claim 1 performs positioning in the scanning direction of optical housing, Since the guidance means which supports optical housing for the direction of an optical axis, enabling free sliding, and a direction positioning means of an optical axis to position the direction of an optical axis of this optical housing in contact with a part of this optical housing at the time of insertion in the direction of an optical axis of optical housing were established Optical housing is made to meet a guidance means and positioning of a scanning direction and positioning of the direction of an optical axis can be performed by the easy actuation to insert. After this, optical housing can be fixed to an orientation only by the firm attachment activity by **** etc., and, thereby, positioning of each light-scanning equipment can be made easy in the image formation equipment which has two or more image formation stations.

[0043] Invention according to claim 2 forms a guidance means in invention according to claim 1 with the slide rail of a Uichi Hidari pair which holds the both sides of optical housing free [sliding]. Since the direction inclination adjustment device of vertical scanning which adjusts the inclination of optical housing in the direction of vertical scanning of the scanning line by preparing one side of a slide rail in the direction of an optical axis and the direction which intersects perpendicularly free [displacement] was constituted By changing the location of one slide rail, the inclination of the direction of vertical scanning of optical housing can be adjusted, therefore the direction inclination adjustment device of vertical scanning can consist of few components.

[0044] Invention according to claim 3 is set to invention according to claim 2. A scanning direction positioning means to hold the 1 side of optical housing in the direction of an optical axis near one back side of the slide rail of a Uichi Hidari pair free [attachment and detachment] and free [rotation in the direction of an optical axis and the direction which intersects perpendicularly], and to define the location of the scanning direction of optical housing is established. Since the direction inclination adjustment device of vertical scanning which adjusts the inclination of optical housing in the direction of vertical scanning of the scanning line by preparing the slide rail of another side supporting free one end of optical housing in the direction of an optical axis and the direction which intersects perpendicularly free [displacement] was constituted When optical housing is inserted along with a slide rail, the location of the scanning direction of optical housing is defined with a scanning direction positioning means. By actuation only by carrying out the variation rate of the slide rail supporting free one end of optical housing, and rotating optical housing, the inclination of the direction of vertical scanning of optical housing can be adjusted.

[0045] The sensor by which invention according to claim 4 receives a laser beam in invention according to claim 3 in the location by the side of the outgoing radiation of optical housing which counters free one end at least, Since an operation means to calculate whenever [inclination / of the direction of vertical scanning of optical housing] with the output of this sensor, and the driving means which drives the direction inclination adjustment device of vertical scanning based on the result of an operation by this operation means were established Even if it does not reproduce the result of having carried out image formation of the laser beam to the scan layer-ed, based on the output from a sensor, whenever [inclination / of optical housing] can be amended automatically.

[0046] When making invention according to claim 5 correspond to the number of scan layers-ed, constructing more than one and installing optical housing, Since a scanning direction positioning means and a guidance means according to claim 3, the direction positioning means of an optical axis, and the

direction inclination adjustment device of vertical scanning were supported by the respectively same supporter material When manufacturing the image formation equipment which has two or more image formation stations, the precision of the relative position of optical housing arranged at each image formation station is raised, and the output of a high-definition image is attained.

[0047] The sensor by which invention according to claim 6 detects optically the scan starting position and scan termination location in every line of each optical housing in invention according to claim 5, An operation means to calculate whenever [inclination / of the direction of vertical scanning of each optical housing] based on the output of these sensors, Since the driving means which drives the direction inclination adjustment device of vertical scanning corresponding to each optical housing based on the result of an operation by this operation means was established Even if it does not reproduce the result of having carried out image formation of the laser beam to the scan layer-ed by driving a vertical-scanning inclination adjustment device based on the output of each sensor, and adjusting the inclination of each optical housing, whenever [relative inclination / of each optical housing] can be amended automatically.

[0048] Invention according to claim 7 is set to invention according to claim 1. A laser light source, Two or more optical housing with which it was equipped with the deflection means which deflects the laser beam by which outgoing radiation was carried out from this laser light source, and the image formation optical system which carries out image formation of the laser beam deflected by this deflection means to a scan layer-ed is installed. Since the deflection means in these optical housing possessed each scan speed change means Even if variation arises in the location of the direction of an optical axis of each optical housing By changing the scan speed of a deflection means, the scale factor of the image formed can be amended uniformly and the direction positioning means of an optical axis can consist of easy structures which optical housing inserted in the direction of an optical axis is made to contact by this.

[0049] Invention according to claim 8 forms the sensor which detects optically the scan starting position and scan termination location in every line of each optical housing in invention according to claim 7. Since it was made to operate a scan speed change means based on time difference with the time of the scan initiation which these sensors detect, and scan termination Even if variation arises in the location of the direction of an optical axis of each optical housing, the scale factor of the image formed can be automatically amended uniformly by changing the scan speed of a deflection means based on the output of a sensor.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the decomposition perspective view showing the relation of the optical housing and means for supporting in one example of this invention.
[Drawing 2] It is the decomposition perspective view showing the components arrangement inside optical housing.
[Drawing 3] It is the vertical section side elevation showing the configuration of the direction inclination adjustment device of vertical scanning.
[Drawing 4] It is the front view showing the supporting structure of a slide rail.
[Drawing 5] It is the top view showing the supporting structure of a slide rail.
[Drawing 6] It is the vertical section side elevation showing the condition of having arranged optical housing for every image formation station.
[Drawing 7] It is the front view showing a sensor.
[Drawing 8] The explanatory view of the scanning line with which (a) is formed for every image formation station, and (b) are timing charts which show the output of a sensor.
[Drawing 9] It is the block diagram showing the drive circuit of a polygon motor.
[Description of Notations]
2 Optical Housing
4 Laser Light Source
6 Deflection Means
7 Eight Image formation optical system
32 Guidance Means
33 34 Slide rail
40 Scanning Direction Positioning Means
41 The Direction Positioning Means of Optical Axis
53 The Direction Inclination Adjustment Device of Vertical Scanning
54 55 Sensor
56 Supporter Material
57 Scan Layer-ed
60 Scan Speed Change Means

[Translation done.]

* NOTICES *

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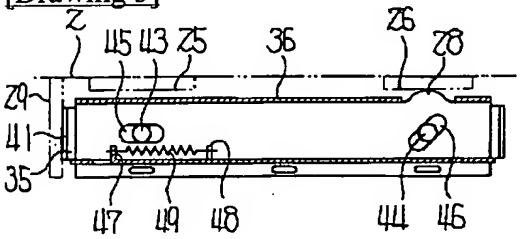
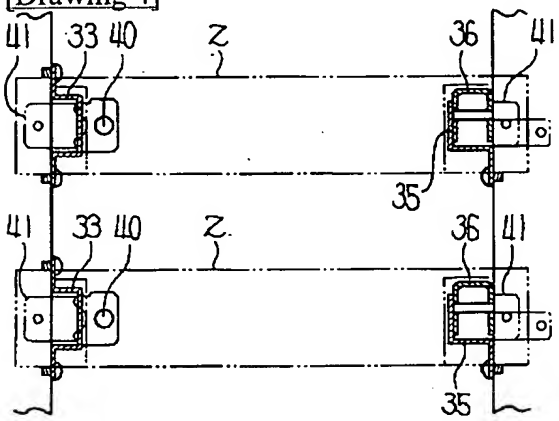
DRAWINGS

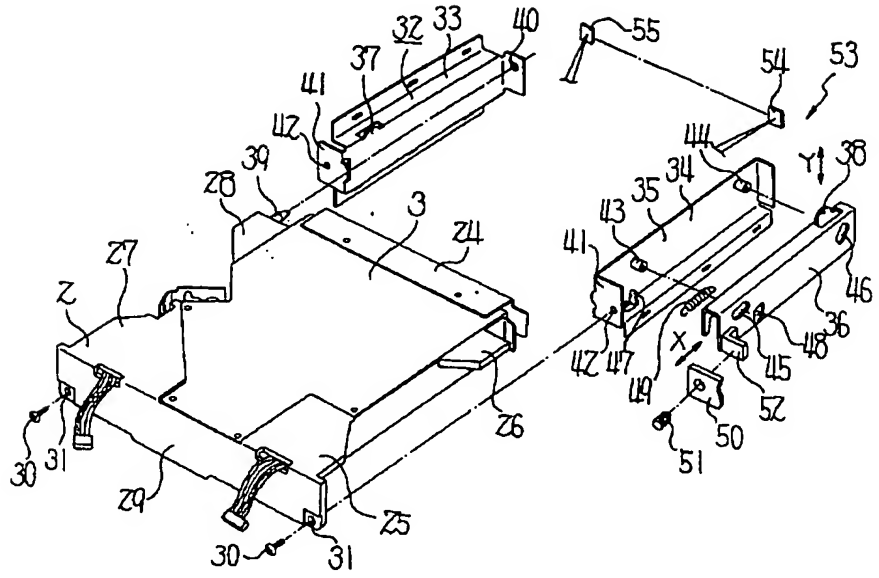
[Drawing 3]



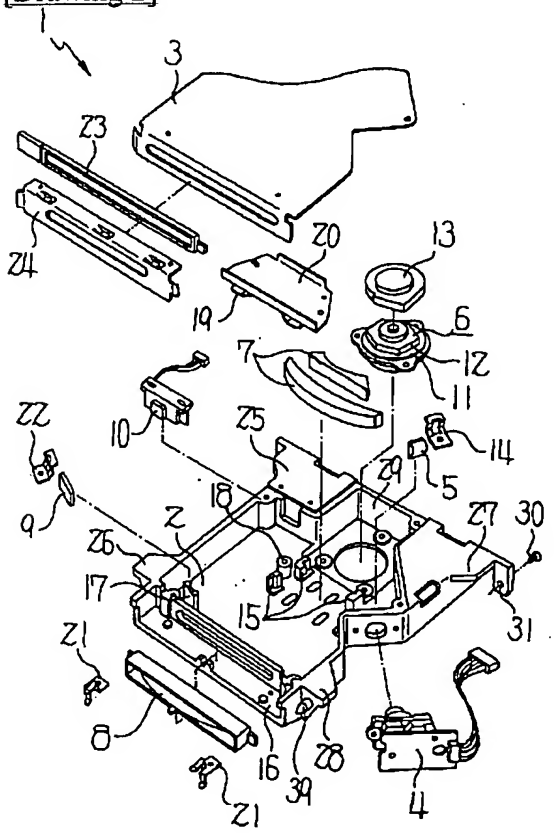
[Drawing 4]



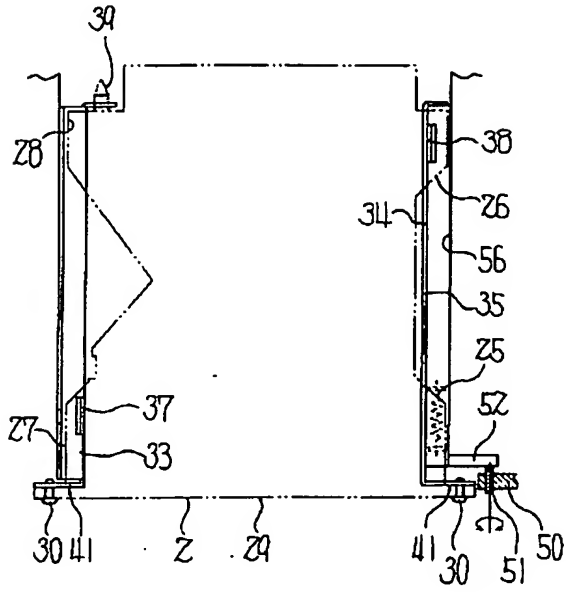
[Drawing 1]



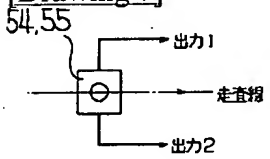
[Drawing 2]



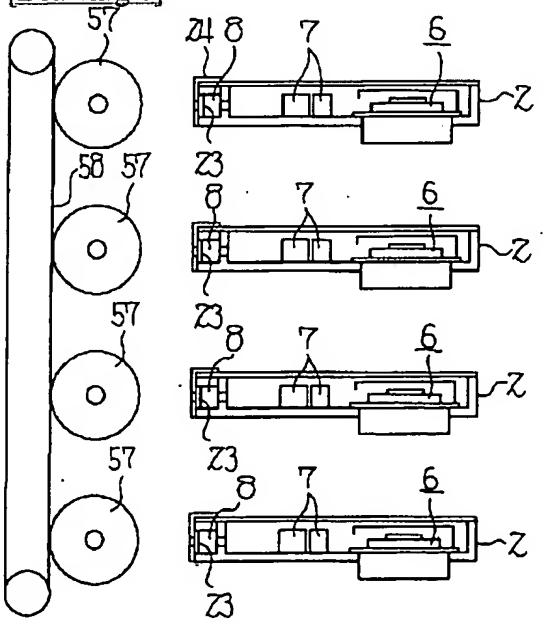
[Drawing 5]



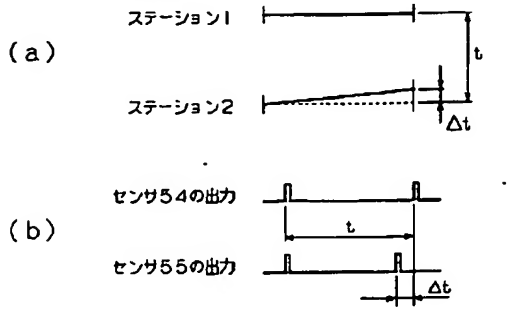
[Drawing 7]



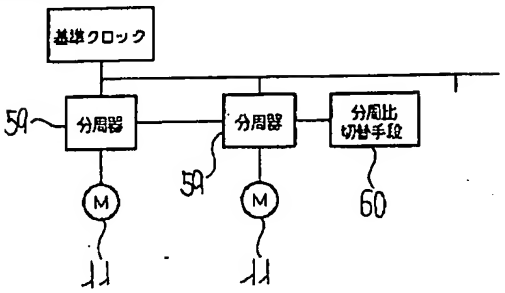
[Drawing 6]



[Drawing 8]



[Drawing 9]



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